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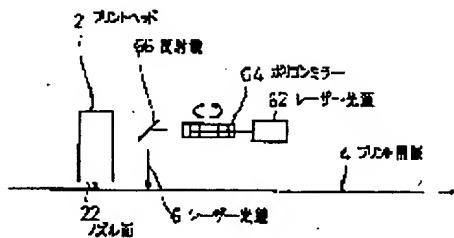
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(54) LIQUID DELIVERY PRINTER AND PRINTING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To realize a liquid delivery printer wherein a solvent contained in a delivered liquid is prevented from being vaporized in a utilization step of a printed item.

SOLUTION: In the liquid delivery printer wherein a liquid comprising dyestuff and solvent is delivered from a print head to form a delivery trace on a printing sheet 4, laser beams 6 are emitted from a laser beam source 62, deflected by a revolving polygon mirror 64, and the path thereof is turned by a reflecting mirror 66 and irradiated onto the printing sheet 4. A vaporization accelerating means comprising the laser beam source 62, polygon mirror 64, and mirror 66 forcibly vaporizes solvent from the sheet 4 so that no solvent is vaporized from the sheet 4 when the sheet is handed to a user.



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CLAIMS

[Claim(s)]

[Claim 1] A liquid regurgitation printer characterized by providing an evaporation acceleration means to accelerate evaporation of said solvent from print data medium which is the liquid regurgitation printer which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and formed said regurgitation trace.

[Claim 2] Said evaporation acceleration means is a liquid regurgitation printer according to claim 1 characterized by what is been what evaporates said solvent compulsorily from said regurgitation trace after formation of said regurgitation trace.

[Claim 3] Said evaporation acceleration means is a liquid regurgitation printer according to claim 2 characterized by what is been what evaporates said solvent compulsorily with non-contact heating.

[Claim 4] A liquid regurgitation printer according to claim 3 characterized by what is been what performs said non-contact heating by light.

[Claim 5] A liquid regurgitation printer according to claim 3 characterized by what is been what performs said non-contact heating with infrared radiation.

[Claim 6] A liquid regurgitation printer according to claim 3 characterized by what is been what performs said non-contact heating with far infrared rays.

[Claim 7] A liquid regurgitation printer according to claim 3 characterized by what is been what performs said non-contact heating by electromagnetic wave.

[Claim 8] Said evaporation acceleration means is the liquid regurgitation printer of any one publication of claim 3 characterized by what is been what heats said regurgitation trace while scanning said print data medium thru/or claim 7.

[Claim 9] Said evaporation acceleration means is a liquid regurgitation printer according to claim 2 characterized by what is been what evaporates said solvent compulsorily from said regurgitation trace by attraction.

[Claim 10] A liquid regurgitation printer according to claim 9 characterized by what is been what performs said attraction by nozzle.

[Claim 11] A liquid regurgitation printer according to claim 9 characterized by what is been what performs said attraction by decompressing an atmospheric pressure of a near [said print data medium].

[Claim 12] A liquid regurgitation printer of any one publication of claim 2 characterized by providing a recovery means to collect said solvents evaporated compulsorily thru/or claim 11.

[Claim 13] A liquid regurgitation printer characterized by providing a recovery means to collect said solvents which evaporated from print data medium which is the liquid regurgitation printer which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and formed said regurgitation trace.

[Claim 14] Said recovery means is a liquid regurgitation printer according to claim 12 or 13 characterized by providing an absorption means to absorb a steam of said solvent.

[Claim 15] Said recovery means is a liquid regurgitation printer according to claim 12 or 13 characterized by providing a liquefaction means to liquefy a steam of said solvent.

[Claim 16] Said recovery means is a liquid regurgitation printer according to claim 12 or 13 characterized by providing a trap means which carries out the trap of the steam of said solvent.

[Claim 17] A liquid regurgitation printer characterized by providing an evaporation suppression means to be the liquid regurgitation printer which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and to inhibit evaporation of said solvent from said regurgitation trace.

[Claim 18] A liquid regurgitation printer according to claim 17 characterized by what is been what performs said suppression by putting an evaporation suppression layer on said regurgitation trace.

[Claim 19] A liquid regurgitation printer according to claim 18 characterized by what said evaporation suppression layer is a layer of a curing agent.

[Claim 20] Print data medium characterized by having an evaporation retardant which is print data medium for liquid regurgitation printers which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and inhibits evaporation of said solvent from said regurgitation trace.

[Claim 21] Print data medium according to claim 20 characterized by what said evaporation retardant is a porosity particle.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to print data medium for a liquid regurgitation printer and such printers which breathes out a liquid from the liquid regurgitation section and forms the regurgitation trace of a liquid in print data medium, such as paper, cloth, a nonwoven fabric, and a plastic film, like an ink jet printer especially about a liquid regurgitation printer and print data medium.

[0002]

[Description of the Prior Art] For example, in an ink jet printer, an ink drop (liquid) is breathed out from the nozzle of the liquid regurgitation section, i.e., a print head, to print data medium, such as paper, and an image and an alphabetic character are printed. In a color-print, a print head has cyanogen, a Magenta, yellow, and an ink arm head about each of four primary colors of a clo, and is expressing the image of various colors etc. with the combination of the ink dot sprayed from each ink arm head. The density of the ink dot which constitutes an image etc. is a 1000 [dozens -] and hundreds dpi degree. illustrating to which the pattern which the combination of the color of an ink dot and they form is supplied from a control unit (computer) - - it is specified with data.

[0003] There is a line arm head as one format of a print head. The line arm head has composition which prints one line of the cross direction of print data medium at once, and a print object is produced by the high speed by the printer using this.

[0004]

[Problem(s) to be Solved by the Invention] As for the print object printed with the high speed printer using a line arm head etc., evaporation (evaporation) of the solvent of ink continues in the condition immediately after creation. When crossed to a user's hand in this condition, evaporation of a solvent continued also in a user's hand and there was a problem that there was that possibility that that it is stinking etc. may cause a user displeasure etc.

[0005] Moreover, since the vaporized solvent piles up into the sediment of the print object of the large quantity printed out at the high speed even when between opens until it crosses to a user's hand, the same problem is produced.

[0006] Made in order that this invention might solve the above-mentioned trouble, the object is realizing a liquid regurgitation printer and print data medium without evaporation of the solvent contained in regurgitation liquid in the utilization phase of a print object. Moreover, it aims at realizing the liquid regurgitation printer which collects the solvents which evaporated.

[0007]

[Means for Solving the Problem] In order to make it there be no evaporation of a solvent in a utilization phase of a print object, technique which accelerates evaporation of a solvent is adopted as creation order of a print object. Moreover, technique which shuts up a solvent is adopted as a created print object.

[0008] (1) Invention of claim 1 for solving a technical problem is a liquid regurgitation printer which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and is a liquid regurgitation printer characterized by

providing an evaporation acceleration means to accelerate evaporation of said solvent from print data medium in which said regurgitation trace was formed.

[0009] In invention of claim 1, evaporation of a solvent from print data medium in which a regurgitation trace was formed is accelerated with an evaporation acceleration means.

(2) Invention of claim 2 for solving a technical problem is a liquid regurgitation printer according to claim 1 characterized by what said evaporation acceleration means is what evaporates said solvent compulsorily from said regurgitation trace after formation of said regurgitation trace.

[0010] In invention of claim 2, a solvent is compulsorily evaporated from a regurgitation trace after formation of a regurgitation trace with an evaporation acceleration means.

(3) Invention of claim 3 for solving a technical problem is a liquid regurgitation printer according to claim 2 characterized by what said evaporation acceleration means is what evaporates said solvent compulsorily with non-contact heating.

[0011] In invention of claim 3, an evaporation acceleration means evaporates a solvent compulsorily with non-contact heating.

(4) Invention of claim 4 for solving a technical problem is a liquid regurgitation printer according to claim 3 characterized by what is been what performs said non-contact heating by light.

[0012] In invention of claim 4, it heats with light and a solvent is evaporated compulsorily.

(5) Invention of claim 5 for solving a technical problem is a liquid regurgitation printer according to claim 3 characterized by being what performs said non-contact heating with infrared radiation.

[0013] In invention of claim 5, it heats with infrared radiation and a solvent is evaporated compulsorily.

(6) Invention of claim 6 for solving a technical problem is a liquid regurgitation printer according to claim 3 characterized by what is been what performs said non-contact heating with far infrared rays.

[0014] In invention of claim 6, it heats with far infrared rays and a solvent is evaporated compulsorily.

(7) Invention of claim 7 for solving a technical problem is a liquid regurgitation printer according to claim 3 characterized by being what performs said non-contact heating by electromagnetic wave.

[0015] In invention of claim 7, it heats by electromagnetic wave and a solvent is evaporated compulsorily.

(8) Invention of claim 8 for solving a technical problem is the liquid regurgitation printer of any one publication of claim 3 characterized by what is been what heats said regurgitation trace thru/or claim 7, while said evaporation acceleration means scans said print data medium.

[0016] In invention of claim 8, while an evaporation acceleration means scans print data medium, a regurgitation trace is heated.

(9) Invention of claim 9 for solving a technical problem is a liquid regurgitation printer according to claim 2 characterized by what said evaporation acceleration means is what evaporates said solvent compulsorily from said regurgitation trace by attraction.

[0017] In invention of claim 9, an evaporation acceleration means evaporates a solvent compulsorily from a regurgitation trace by attraction.

(10) Invention of claim 10 for solving a technical problem is a liquid regurgitation printer according to claim 9 characterized by being what performs said attraction by nozzle.

[0018] In invention of claim 10, it draws in with a nozzle and a solvent is compulsorily evaporated from a regurgitation trace.

(11) Invention of claim 11 for solving a technical problem is a liquid regurgitation printer according to claim 9 characterized by what is been what performs said attraction by decompressing an atmospheric pressure of a near [said print data medium].

[0019] In invention of claim 11, it comes out by decompressing an atmospheric pressure of a near [print data medium], and a solvent is compulsorily evaporated from a trace.

(12) Invention of claim 12 for solving a technical problem is the liquid regurgitation printer of any one publication of claim 2 characterized by providing a recovery means to collect said solvents evaporated compulsorily thru/or claim 11.

[0020] In invention of claim 12, a recovery means recovers a solvent evaporated compulsorily.

(13) Invention of claim 13 for solving a technical problem is a liquid regurgitation printer which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and is a liquid regurgitation printer characterized by providing a recovery means to collect said solvents which evaporated from print data medium in which said regurgitation trace was formed.

[0021] In invention of claim 13, a recovery means recovers a solvent which evaporated from a regurgitation trace of print data medium.

(14) Invention of claim 14 for solving a technical problem is a liquid regurgitation printer according to claim 12 or 13 characterized by said recovery means possessing an absorption means to absorb a steam of said solvent.

[0022] In invention of claim 14, an absorption means absorbs and recovers a steam of a solvent.

(15) Invention of claim 15 for solving a technical problem is a liquid regurgitation printer according to claim 12 or 13 characterized by said recovery means possessing a liquefaction means to liquefy a steam of said solvent.

[0023] In invention of claim 15, a liquefaction means liquefies and recovers a steam of a solvent.

(16) Invention of claim 16 for solving a technical problem is a liquid regurgitation printer according to claim 12 or 13 characterized by said recovery means possessing a trap means which carries out the trap of the steam of said solvent.

[0024] In invention of claim 16, the trap of the steam of a solvent is carried out and a trap means recovers it.

(17) Invention of claim 17 for solving a technical problem is a liquid regurgitation printer which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and is a liquid regurgitation printer characterized by providing an evaporation suppression means to inhibit evaporation of said solvent from said regurgitation trace.

[0025] In invention of claim 17, evaporation of a solvent from a regurgitation trace is inhibited with an evaporation suppression means.

(18) Invention of claim 18 for solving a technical problem is a liquid regurgitation printer according to claim 17 characterized by what is been what performs said suppression by putting an evaporation suppression layer on said regurgitation trace.

[0026] In invention of claim 18, evaporation of a solvent is inhibited by putting an evaporation suppression layer on a regurgitation trace.

(19) Invention of claim 19 for solving a technical problem is a liquid regurgitation printer according to claim 18 characterized by what said evaporation suppression layer is a layer of a curing agent.

[0027] In invention of claim 19, a layer of a curing agent is put and evaporation of a solvent is inhibited.

(20) Invention of claim 20 for solving a technical problem is print data medium for liquid regurgitation printers which breathes out a liquid which consists of coloring matter and a solvent, and forms a regurgitation trace in print data medium, and is print data medium characterized by having an evaporation retardant which inhibits evaporation of said solvent from said regurgitation trace.

[0028] In invention of claim 20, evaporation of a solvent from a regurgitation trace is inhibited with an evaporation retardant which print data medium has.

(21) Invention of claim 21 for solving a technical problem is print data medium according to claim 20 characterized by what said evaporation retardant is a porosity particle.

[0029] In invention of claim 21, a solvent is caught by porosity particle and evaporation is inhibited.

[0030]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to details with reference to a drawing. In addition, this invention is not limited to the gestalt of operation. Moreover, although the example whose print data medium is paper explains, print data medium is not restricted to paper and contains cloth, a nonwoven fabric, a plastic film, and all

other data medium that can support the regurgitation trace of a liquid.

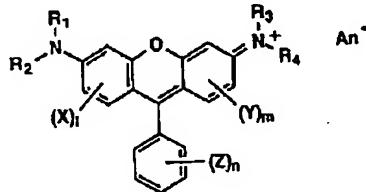
[0031] The mimetic diagram of the configuration of the body of an ink jet printer is shown in drawing 1. This equipment is an example of the gestalt of operation of the liquid regurgitation printer of this invention. As shown in drawing 1, this equipment has a print head 2. A print head 2 prints ink for an image, an alphabetic character, etc. on the print form 4 as discharge and a regurgitation trace of ink. The print form 4 is an example of the gestalt of operation of print data medium in this invention. Ink is an example of the gestalt of operation of the liquid which consists of the coloring matter and the solvent in this invention.

[0032] Here, the matter expressed with the following general formula (1) as coloring matter, for example is used.

[0033]

[Formula 1]

一般式 (1)



[0034] R1 </SUB>, R2, R3, and R4 express an aliphatic series radical, an aromatic series radical, or a hydrogen atom respectively among [type, X, Y, and Z express a substituent respectively, l and m express the integer of 0-3 respectively, and n expresses 0-5. An - A pair anion is expressed (however, when a pair anion exists in the substituent in a molecule, it considers as an unnecessary thing). However, one R2 NR(s) and NR three R4 At least one side of a radical shall be the radical of the cyclic structure expressed with the following general formula (2).]

[0035]

[Formula 2]

一般式 (2)



[0036] Moreover, as a solvent, a drainage system solvent or an oil system solvent is used, for example. Generally a drainage system solvent uses water (for example, ion exchange water is desirable) and a water-soluble organic solvent. As an example of a water-soluble induction solvent, alcohols, polyhydric alcohol, polyhydric-alcohol ether, amines, amides, heterocycles, sulfoxides, sulfones, a urea, an acetonitrile, an acetone, etc. are mentioned. An organic solvent is used for an oil system solvent. In addition to what was illustrated as a water-soluble organic solvent in the above-mentioned drainage system solvent as an example of an organic solvent, ester, ether, ketones, and hydrocarbons are mentioned.

[0037] The print form 4 has predetermined width of face in the direction vertical to the space of drawing 1, and is transported rightward in drawing according to the delivery device which is not illustrated. The print head 2 is supported fixed by the means for supporting which are not illustrated. A print head 2 has the length equivalent to the width of face of the print form 4 in the direction vertical to the space of drawing 1, and has the ink delivery (nozzle) of a large number which are not illustrated to the nozzle side 22 which meets the print form 4 along the length direction. That is, the print head 2 is a line arm head. The ink regurgitation from each nozzle of a line arm head is controlled by the control unit which is not illustrated, and forms in the print form 4 which moves rightward, predetermined ink regurgitation trace, i.e., print.

[0038] In addition, although the example used one line explains a print head 2 in this book, it cannot be overemphasized that four print heads 2 are used for a color-print corresponding to four primary colors of cyanogen, a Magenta, yellow, and a clo.

[0039] A laser beam 6 is irradiated by the portion [finishing / the print of the print form 4]. As a laser beam 6, a visible ray, infrared radiation, or far infrared rays is used. Outgoing radiation is

carried out, it deviates from the laser light source 62 by the polygon mirror 64 to rotate, an optical path is bent with a reflecting mirror 66, and a laser beam 6 is irradiated by the print form 4. The portion which consists of the laser light source 62, a polygon mirror 64, and a reflecting mirror 66 is an example of the gestalt of operation of the evaporation acceleration means in this invention. The optical system which consists of the laser light source 62 thru/or a reflecting mirror 66 is supported fixed by the means for supporting which are not illustrated.

[0040] It takes to the revolution of the polygon mirror 64, the spot of a laser beam 6 scans the print form 4 crosswise, and a print side is heated by non-contact. The reinforcement of heating is the degree which evaporates thoroughly the solvent contained in the ink breathed out in the print form 4. Even if compulsory evaporation (evaporation) of an ink solvent is promptly performed after a print by this and a print object includes a user's hand immediately after a print on the print form 4 by it, the situation where the solvent of ink evaporates from a print object is not produced.

[0041] As shown in drawing 2, the non-contact heating apparatus 68 formed in the downstream of a print head 2 may be made to perform heating of a print side. In addition, in drawing 2, the same sign is given to the same portion as drawing 1, and explanation is omitted.

[0042] The non-contact heating apparatus 68 has the length equivalent to the width of face of the print form 4, in this direction, it arranges many emitters, such as LD (laser diode) and LED (light emitting diode), is constituted, and is supported fixed by the means for supporting which are not illustrated.

[0043] An emitter generates a visible ray, infrared radiation, or far infrared rays. By heating a print side with such a light, a solvent is compulsorily evaporated from the regurgitation trace of ink. In addition, the non-contact heating apparatus 68 may be heated by electromagnetic waves, such as microwave, instead of light. Moreover, it may be made to perform non-contact heating from the background of the print form 4.

[0044] Moreover, the non-contact heating apparatus 68 does not necessarily need to have the length equivalent to the width of face of the print form 4, and it may constitute it so that it may be made a thing shorter than it and may scan in the width-of-face direction of the print form 4. This is desirable at the point which shares the scanner, and it is made to scan together, and simplifies a scanner, when a print head 2 is not a line mold but a scan mold.

[0045] Other examples of the gestalt of operation of this invention are shown in drawing 3. In this drawing, the same sign is given to the same portion as drawing 1, and explanation is omitted. In the example of a gestalt of this operation, an aspirator 70 is formed in the downstream of a print head 2, the air near the front face of the print form 4 is attracted, a solvent is compulsorily evaporated from an ink regurgitation trace according to the air current which it produces, and the solvent which evaporated is attracted.

[0046] An aspirator 70 has the length equivalent to the width of face of the print form 4, and is supported fixed by the means for supporting which are not illustrated. An aspirator 70 has the suction section 72 close to the print form 4, and the nozzle for the suction of the air which is not illustrated is formed here, and it attracts air by the revolution of a fan prepared in the interior.

[0047] An aspirator 70 is good also as a thing as shown in drawing 4. In this drawing, the same sign is given to the same portion as drawing 1, and explanation is omitted. As shown in this drawing, the aspirator 70 consists of pumps 76 which decompress the wrap bonnet box 74 and its internal atmospheric pressure in the portion [finishing / the print of the print form 4]. The bonnet box 74 and the pump 76 are supported fixed by the means for supporting which are not illustrated. The solvent which the solvent was evaporated compulsorily and evaporated is discharged through a pump 76 by decompressing the internal atmospheric pressure of the bonnet box 74 with a pump 76.

[0048] Other examples of the gestalt of operation of this invention are shown in drawing 5. In this drawing, the same sign is given to the same portion as drawing 1, and explanation is omitted. In the example of a gestalt of this operation, a print head 2 and the print form 4 are formed in the wrap bonnet box 80, and the absorbent 82 is held in the hold section 84 of permeability inside the bonnet box 80. The bonnet box 80 and an absorbent 82 are examples of

the gestalt of operation of the recovery means in this invention. An absorbent 82 is an example of the gestalt of operation of the absorption means in this invention.

[0049] As an absorbent 82, the porosity particle which consists of an alumina (aluminum 2O3), a silica (SiO2), etc., for example is used, and the solvent which evaporated from the ink regurgitation trace is absorbed. It is prevented that the steam of a solvent emits around an ink jet printer by this. The absorbent 82 which absorbed the solvent steam is exchanged for the new absorbent 82 by timely, and, as for the used absorbent 82, disposal with proper abolition etc: is made.

[0050] Recovery of a solvent condenses the solvent steam around the cooling arm head 86, and liquefies, and you may make it collect it to a liquid pool 90 by cooling the cooling arm head 86 prepared in the bonnet box 80 with a cooling system 88, as it does not restrict to absorption and is shown in drawing 6. As for the collected solvent, disposal of abolition etc. is made suitably. Or you may make it reuse.

[0051] The bonnet box 80, the cooling arm head 86, a cooling system 88, and a liquid pool 90 are examples of the gestalt of operation of the recovery means in this invention. The cooling arm head 86 and a cooling system 88 are examples of the gestalt of operation of the liquefaction means in this invention. Combination of the cooling arm head 86 and a cooling system 88 is realized by for example, a semiconductor cooling element, its control unit, or RAJIETA and a compressor.

[0052] recovery of a solvent -- moreover -- for example, the trap of the solvent steam is carried out to trap liquid 82' which put in for example, becomes the liquid pool 90 prepared in the bonnet box 80 from water or a proper solution, and you may make it collect as a mixed solution, as shown in drawing 7 Trap liquid 82' is exchanged for trap liquid 82' new to timely, and, as for used trap liquid 82', proper disposal of abolition etc. is made.

[0053] The bonnet box 80, trap liquid 82', and a liquid pool 90 are examples of the gestalt of operation of the recovery means in this invention. Trap liquid 82' is an example of the gestalt of operation of the trap means in this invention.

[0054] You may make it use for recovery of the solvent compulsorily evaporated by either of the configurations of that the solvent recovery means shown in ** drawing 5 thru/or drawing 7 was shown in drawing 1 thru/or drawing 4 . This is desirable at the point of not making the perimeter of an ink jet printer emitting the solvent evaporated compulsorily.

[0055] Other examples of the gestalt of operation of this invention are shown in drawing 8 . In this drawing, the same sign is given to the same portion as drawing 1 , and explanation is omitted. He forms the blasting arm head 92 in the downstream of a print head 2, and is trying to spray the liquefied curing agent 94 on the front face of the print form [finishing / a print] 4 in the example of a gestalt of this operation. The blasting arm head 92 is an example of the gestalt of operation of the evaporation suppression means in this invention. A curing agent 94 is supplied to the blasting arm head 92 from the curing agent container 96.

[0056] The layer of the curing agent which is not illustrated on the front face of a print form [finishing / a print] by blasting of a curing agent 94 is put. A solvent is confined by this layer and evaporation is inhibited. The layer of a curing agent is an example of the gestalt of operation of the evaporation suppression layer in this invention. A curing agent is an example of the gestalt of operation of the curing agent in this invention.

[0057] It may be made to realize suppression of evaporation of the ink solvent from the print form [finishing / a print] 4 also by giving an evaporation retardant to the print form 4. An evaporation retardant is an example of the gestalt of operation of the evaporation retardant in this invention. As an evaporation retardant, a silica (SiO2), the matter (aluminum 2O3), for example, the alumina, which adsorbs a solvent, etc. is used. That it is a porosity particle has the high rate of adsorption capacity of a solvent, and adsorbate's is desirable at the point of excelling in evaporation checked. A porosity particle is an example of the gestalt of operation of the porosity particle in this invention.

[0058]

[Effect of the Invention] As explained to details above, since evaporation of the solvent from print data medium in which the regurgitation trace was formed was accelerated with the

evaporation acceleration means, by invention of claim 1, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable in the utilization phase of a print object.

[0059] Moreover, since it was made to evaporate a solvent compulsorily from a regurgitation trace after formation of a regurgitation trace, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable in invention of claim 2, with an evaporation acceleration means. Moreover, since it was made to evaporate a solvent compulsorily with non-contact heating, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable in invention of claim 3, with an evaporation acceleration means.

[0060] Moreover, in invention of claim 4, since it heats with light and was made to evaporate a solvent compulsorily, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0061] Moreover, in invention of claim 5, since it heats with infrared radiation and was made to evaporate a solvent compulsorily, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0062] Moreover, in invention of claim 6, since it heats with far infrared rays and was made to evaporate a solvent compulsorily, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0063] Moreover, in invention of claim 7, since it heats by the electromagnetic wave and was made to evaporate a solvent compulsorily, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0064] Moreover, in invention of claim 8, since the regurgitation trace was heated while the evaporation acceleration means scanned print data medium, a configuration can be simplified by sharing the scanner of the liquid discharge head of a scan mold.

[0065] Moreover, in invention of claim 9, since it was made for an evaporation acceleration means to evaporate a solvent compulsorily from a regurgitation trace by attraction, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0066] Moreover, in invention of claim 10, since it draws in with a nozzle and was made to evaporate a solvent compulsorily from a regurgitation trace, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0067] Moreover, in invention of claim 11, since it comes out by decompressing the atmospheric pressure of a near [print data medium] and was made to evaporate a solvent compulsorily from a trace, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0068] Moreover, in invention of claim 12, since the recovery means recovered the solvent evaporated compulsorily, it can prevent that the steam of a solvent emits around. Moreover, in invention of claim 13, since the recovery means recovered the solvent which evaporated from the regurgitation trace of print data medium, it can prevent that the steam of a solvent emits around.

[0069] Moreover, in invention of claim 14, since the steam of a solvent is absorbed and it was made to collect with an absorption means, it can prevent that the steam of a solvent emits around. Moreover, in invention of claim 15, since the steam of a solvent is liquefied and it was made to collect with a liquefaction means, it can prevent that the steam of a solvent emits around.

[0070] Moreover, in invention of claim 16, since the trap of the steam of a solvent is carried out and they were collected with the trap means, the mixed solution which prevented and collected that the steam of a solvent emitted around can be discarded appropriately.

[0071] Moreover, in invention of claim 17, since evaporation of the solvent from a regurgitation trace was inhibited with the evaporation suppression means, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation

liquid is realizable.

[0072] Moreover, in invention of claim 18, since evaporation of a solvent was inhibited by putting an evaporation suppression layer on a regurgitation trace, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0073] Moreover, in invention of claim 19, since the layer of a curing agent is put and evaporation of a solvent was inhibited, in the utilization phase of a print object, a liquid regurgitation printer without evaporation of the solvent contained in regurgitation liquid is realizable.

[0074] Moreover, in invention of claim 20, since evaporation of the solvent from a regurgitation trace was inhibited with the evaporation retardant which print data medium has, in the utilization phase of a print object, print data medium without evaporation of the solvent contained in regurgitation liquid is realizable.

[0075] Moreover, in invention of claim 21, since a solvent is caught by the porosity particle and evaporation was inhibited, in the utilization phase of a print object, print data medium without evaporation of the solvent contained in regurgitation liquid is realizable.

[Translation done.]

*** NOTICES ***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS**[Brief Description of the Drawings]**

[Drawing 1] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Drawing 2] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Drawing 3] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Drawing 4] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Drawing 5] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Drawing 6] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Drawing 7] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Drawing 8] It is the mimetic diagram showing the configuration of the body of the equipment of an example of the gestalt of operation of this invention.

[Description of Notations]

2 Print Head

4 Print Form

6 Laser Beam

68 Non-contact Heating Apparatus

70 Aspirator

74 80 Bonnet box

76 Pump

82 Absorbent

82' trap liquid

86 Cooling Arm Head

[Translation done.]